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DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371**

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

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INTERNATIONAL APPLICATION NO.  
PCT/EP00/09427

INTERNATIONAL FILING DATE  
27 September 2000  
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PRIORITY DATE CLAIMED:  
14 October 1999  
(14.10.99)

TITLE OF INVENTION  
**DEVICE FOR CONTROLLING A TELECOMMUNICATIONS SYSTEM**

APPLICANT(S) FOR DO/EO/US  
Wolfgang RIES; Martina GROHS, and Hans SPIRA

Applicant(s) herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) immediately rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☒ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)) **UNSIGNED**.
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.  
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☒ A substitute specification and a marked up version of the substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information: International Search Report and Form PCT/RO/101.

Express Mail No.: EL244505351US

17. ☒ The following fees are submitted:**Basic National Fee (37 CFR 1.492(a)(1)-(5)):**

Search Report has been prepared by the EPO or JPO ..... \$860.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) ..... \$690.00

No international preliminary examination fee paid to USPTO (37 CFR 1.482) but  
international search fee paid to USPTO (37 CFR 1.445(a)(2)) ..... \$710.00Neither international preliminary examination fee (37 CFR 1.482) nor international  
search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$1,000.00International preliminary examination fee paid to USPTO (37 CFR 1.482) and all  
claims satisfied provisions of PCT Article 33(2)-(4) ..... \$100.00

CALCULATIONS | PTO USE ONLY

**ENTER APPROPRIATE BASIC FEE AMOUNT =**

\$ 860

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months  
from the earliest claimed priority date (37 CFR 1.492(e)).

\$

Claims	Number Filed	Number Extra	Rate	
Total Claims	4 - 20 =	0	X \$18.00	\$0
Independent Claims	1 - 3 =	0	X \$80.00	\$0
Multiple dependent claim(s) (if applicable)			+ \$270.00	\$0

**TOTAL OF ABOVE CALCULATIONS =**

\$860

Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must  
also be filed. (Note 37 CFR 1.9, 1.27, 1.28).

\$

**SUBTOTAL =**

\$860

Processing fee of \$130.00 for furnishing the English translation later the ☐ 20 ☐ 30  
months from the earliest claimed priority date (37 CFR 1.492(f)).

\$

**TOTAL NATIONAL FEE =**

\$860

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be  
accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property

\$

**TOTAL FEES ENCLOSED =**

\$860

Amount to be  
refunded  
charged\$  
\$

- a. ☐ A check in the amount of \$\_\_\_\_\_ to cover the above fees is enclosed.
- b. ☒ Please charge my Deposit Account No. 11-0600 in the amount of \$860.00 to cover the above fees. A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 11-0600. A duplicate copy of this sheet is enclosed.

**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

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SIGNATURE

Richard L. Mayer, Reg. No. 22,490  
NAME

DATE

CUSTOMER NO. 26646

[2345/157]

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant(s) : Wolfgang RIES et al.  
Serial No. : To Be Assigned  
Filed : Herewith  
For : DEVICE FOR CONTROLLING A  
TELECOMMUNICATIONS SYSTEM  
Art Unit : To Be Assigned  
Examiner : To Be Assigned

Assistant Commissioner  
for Patents  
Washington, D.C. 20231

**PRELIMINARY AMENDMENT AND  
37 C.F.R. § 1.125 SUBSTITUTE SPECIFICATION STATEMENT**

SIR:

Please amend the above-identified application before examination, as set forth  
below.

**IN THE TITLE:**

Please replace the title with the following:

--DEVICE FOR CONTROLLING A TELECOMMUNICATIONS SYSTEM--.

**IN THE SPECIFICATION AND ABSTRACT:**

In accordance with 37 C.F.R. § 1.121(b)(3), a Substitute Specification (including the Abstract, but without claims) accompanies this response. It is respectfully requested that the Substitute Specification (including Abstract) be entered to replace the Specification of record.

**IN THE CLAIMS:**

Without prejudice, please cancel original claims 1 to 4 in the underlying PCT application and please add new claims 5 to 8 as follows:

--5. (New) A device for controlling a telecommunications system between a plurality of networks, each network of the plurality of networks being designed for services or parts of services, comprising:

- at least one network management device;
- at least one service management device; and
- at least one domain manager;

wherein the at least one domain manager has access to a selected network management device;

wherein the at least one service management device is selected, and the at least one domain manager is linkable to the selected at least one service management device; and

wherein the at least one network management device is assigned to each network of the plurality of networks and the at least one network management device being controllable by the at least one service management device.

6. (New) The device as recited in claim 5, further comprising:

a controllable matrix to link the at least one service management device to the at least one domain manager.

7. (New) The device as recited in claim 6, wherein:

the controllable matrix is configured to be controlled in conformance with an end-to-end connection to be managed.

8. (New) The device as recited in claim 6, further comprising:

an at least one customer network management device,

wherein the at least one customer network management device is configured connectable via the controllable matrix.--

#### **REMARKS**

This Preliminary Amendment cancels without prejudice original claims 1 to 4 in the underlying PCT Application No. PCT/EP00/09427, and adds without prejudice new claims 5 to 8. The new claims conform the claims to U.S. Patent and Trademark Office rules and do not add new matter to the application.

In accordance with 37 C.F.R. § 1.121(b)(3), the Substitute Specification (including the Abstract, but without the claims) contains no new matter. The amendments

reflected in the Substitute Specification (including Abstract) are to conform the Specification and Abstract to U.S. Patent and Trademark Office rules or to correct informalities. As required by 37 C.F.R. § 1.121(b)(3)(iii) and § 1.125(b)(2), a Marked Up Version Of Substitute Specification comparing the Specification of record and the Substitute Specification also accompanies this Preliminary Amendment. In the Marked Up Version, shading indicates added text and brackets indicated deleted text. Approval and entry of the Substitute Specification (including Abstract) is respectfully requested.

The underlying PCT Application No. PCT/EP00/09427 includes an International Search Report, dated April 2, 2001. The Search Report includes a list of documents that were uncovered in the underlying PCT Application. A copy of the Search Report accompanies this Preliminary Amendment.

Applicants assert that the subject matter of the present application is new, non-obvious, and useful. Prompt consideration and allowance of the application are respectfully requested.

Respectfully Submitted,

KENYON & KENYON

By: *[Signature]*  
RJ No 35, 852

Dated: 6/13/01

By: *[Signature]*  
Richard L. Mayer  
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**CUSTOMER NO. 26646**

## DEVICE FOR CONTROLLING A TELECOMMUNICATIONS SYSTEM

FIELD OF THE INVENTION

The present invention relates to a device for controlling a telecommunications system made up of a plurality of networks, the networks being designed for services or parts of services, a network management device being assigned to each network, and the network management devices being controllable by service management devices.

BACKGROUND INFORMATION

In the broadest sense, telecommunications systems are made up of a plurality of networks, several of which are interconnected, depending on the particular requirement, to establish an end-to-end connection. To control and monitor such systems, a functional management architecture is required, as described, for example, in ITU-T recommendations, in particular M.3010. A management architecture of this kind is schematically illustrated in Figure 2.

The lowest layer contains network elements NE, which are each managed by an element management device EMS. Above that, resides a layer made up of network management devices NMS, to which service management devices SMS are linked at a higher level. The functions of service management device SMS can be assumed, in part, by the customers themselves. This function is referred to as customer network management CNM. To manage the entire communications system in terms of business operations, the business management device BMS is then used.

In a nutshell, the network management devices are

SUBSTITUTE SPECIFICATION

responsible for monitoring and controlling the network elements situated in one geographic region, while the contractual aspects of the services provided to the customers are the focus of the service management device. These include, inter alia, service orders, service complaints, and billing/accounting. In this connection, the concepts "NMF = network management function" and "SMF = service management function" were introduced for the functionalities allocated to the respective management layers.

A capability of the communications system is to make available so-called end-to-end connections, a plurality of networks being required depending on the type of connection. To provide this as a most versatile possible service, the service management devices must, therefore, access a multiplicity of network management devices NMS. The result in the available systems is, therefore, a so-called many-to-many relation, as illustrated in Figure 3. In the process, the number of interfaces required between the network management devices NMS and the service management devices SMS quickly becomes virtually unmanageable.

#### SUMMARY OF THE INVENTION

The present invention provides a device and method for controlling a telecommunications system made up of a plurality of networks, which will enable the service management devices to access the network management devices required for the particular services.

The present invention further provides domain management devices, which enable the service management devices to access network management devices. The domain management devices, in turn, have access to selected network management devices and are each able to be linked to a

service management device.

The present invention further provides a device which requires a substantially smaller number of interfaces at the service management devices and the network management devices than available devices.

The present invention further provides for a controllable matrix for linking the service management devices to the domain management devices. The present invention further provides for the controllable matrix to be controlled in conformance with the end-to-end connections to be managed in each instance.

The present invention further provides for at least one customer network management device to be connectable via the matrix. This renders possible a dynamic allocation between the particular network management devices and customer network management devices, without entailing additional outlay for switching equipment.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a block diagram of an exemplary embodiment according to the present invention.

Figure 2 shows a schematic representation of an available multilayer concept in accordance with the ITU-T recommendation.

Figure 3 shows an exemplary schematic representation of the many-to-many relations between service management devices and network management devices according to the present invention.

Figure 4 shows a block diagram of a further exemplary embodiment according to the present invention.



Figure 5 shows a block diagram of a domain management device employed in the device according to the exemplary embodiment of Figure 4 according to the present invention.

Figure 6 shows an exemplary end-to-end connection traversing a plurality of networks which are managed by a device according to the present invention.

Figure 7 shows a table illustrating certain improvements effected according to the present invention.

Figure 8 shows a table illustrating certain improvements effected according to the present invention.

Figure 9 shows a table illustrating certain improvements effected according to the present invention.

#### DETAILED DESCRIPTION

According to the present invention, Figure 1 illustrates three service management devices SMS, each of which is connected to three domain managers DM, to which three or two network management devices are connected, in turn. A comparison to Figure 3 reveals that substantially fewer interfaces are needed than is the case when working with an available device.

According to the present invention, Figure 3 illustrates five service management devices 1 through 5 able to be connected via a matrix 6, in the following, also referred to as a correlation matrix, to five domain managers 7 through 11. Domain managers 7 through 11 have access to network management devices, of which three network management devices 12, 13, 14, are shown as examples in Figure 4.

Also connected to correlation matrix 6 is a server 15 for the customer network management. Moreover, correlation matrix 6 is connected to two databases 16, 17, one being used as database KD DB (customer database), and the other as database SLA (= service level agreement). Server 15 can exchange data via two layers 18, 19 with customer devices 20, layer 18 providing a suitable operational structure in the sense of a corporate identity, identifying the telecommunications carrier, while layer 19 is designed as a security layer. In addition, each of network management devices 12, 13, 14 has assigned B-CNM (= basic customer network management) devices, whose data are fed to server 15.

Figure 5 depicts the functional units of a domain manager 7 through 11 (Figure 4). In this context, a management information distributor 31 is employed for the connection to correlation matrix 6 (Figure 4). A further data processing device 32 is used for data preparation, for precorrelation, and for converting from NMF to SMF. Subsystem adapters 33, 34, 35, of which three are shown illustratively in Figure 5, are used for the connection to the particular network management devices.

In parallel to service management devices 1 through 5, the service-oriented information is supplied to customer network management server 15. This ensures a uniform, comprehensive method for accessing the CNM information. The customer databases, domain-, service-, and customer-network management devices are linked with the aid of correlation matrix 6, employing an object-based communications infrastructure, which supports an end-to-end service correlation and renders possible a flexible modeling of complex services by combining the information communicated by the domain managers.

This communications infrastructure enables the service-relevant interconnection objects of various domain managers to be queried by the responsible service management device SMS, and for status modifications to be  
5 routed by the domain managers in dedicated fashion to service management device SMS. In addition, it provides the basis for transmitting customer queries from the customer network management system to service management device SMS and vice versa, to make available information  
10 of relevance to the customer, from service management device SMS via the customer network management system. Also the basic information for the correlation is fed via this communications infrastructure to the domain managers, service management devices SMS, and to the  
15 customer network management systems.

The functionality of the domain managers resides in the adaptation of the subsystems, in the conversion of the network management information received from the  
20 subsystems, from the domains of fault, performance, and configuration management, into service-oriented information, as well as in the conversion of requests received from the service management devices into network management requests, and in the routing of such requests  
25 to the appropriate network management devices. The interface directed to service management devices is designed as a standardized, object-oriented interface, and is integrated in the communications infrastructure. Moreover, the domain manager assures the bidirectional  
30 exchange of information, and that the requests contained in the security concept with respect to access restrictions to the network management devices and with respect to the integrity and confidentiality of the data are observed (security management functions).

35 Figure 6 depicts the networks and management devices used

for a frame-relay end-to-end connection. The connection is established between two terminal devices 41, 42, shown as computers, in each case via a customer service switch 43, 44, access networks 45, 46, and an ATM network 47 as a backbone network. A network management device 48, 49, 50 is provided to manage each of these networks. Each of these network management devices is assigned, together with other network management devices, to a domain manager 51, 52. A service management device 53 has access to domain managers 51, 52 via a correlation matrix that is not shown in Figure 6. For purposes of exchanging data, customer database 16 is linked to the domain managers and to service management device 53. Moreover, customer network management device 54 is connected to the service management device. The end-to-end connection from point A to point B is displayed on a screen 55 of customer network management device 54, making it possible for an operator to visualize the status of the connection and to intervene in case of errors.

Some of the benefits of the device according to the present invention are elucidated in the following on the basis of an application example, where service and customer network management are made available for services based on ATM, frame relay, and leased link. For this, network management information from the following networks is to be integrated:

- 3 NMS for access components (B-NT-NMS, DTNMS and router NMS);
- 2 NMS for leased link (BFS, 46020);
- 3 NMS for ATM (Nortel NMS, 46020, NavisCore);
- 1 NMS for frame relay (Nortel NMS).

The relevance of the management information from the management perspective can be inferred from Figure 7.

From this it is apparent that, on the average, two interfaces are required per network management device in the direction of the service management devices; and five to seven interfaces per service management device in the direction of the network management devices.

Figure 8 depicts the interfaces required at the domain managers in the direction of the individual networks and vice versa; while Figure 9 illustrates the interfaces required between the domain managers and the service management devices. One can discern that, regardless of the number of service management devices and independently of the service modeling, only one interface is needed for each network management device. The advantages are particularly evident by the reduction in the load on the network management devices and the networks resulting from the transfer of management information. Also, the number of subnetwork management devices to be integrated per domain is substantially less than the number needed for a direct integration.

The correlation matrix can be used to properly channel the information relevant to the individual service management devices by performing a one-time correlation to administrative customer data. Customer network management server 15 can be interfaced in such a way that all information relevant to customer network management is acquired via the correlation matrix as service-spanning information, but is provided with customer and service identification.

# ABSTRACT

5 A device for controlling a telecommunications system made  
up of a plurality of networks, the networks being  
designed for services or parts of services, a network  
management device being assigned to each network, and the  
network management devices being controllable by service  
management devices, in order for the service management  
devices to access network management devices, domain  
managers are provided, which, in turn, have access to  
10 selected network management devices and are each able to  
be linked to a service management device.

DEVICE FOR CONTROLLING A TELECOMMUNICATIONS SYSTEM

The present invention is directed to a device for controlling a telecommunications system made up of a plurality of networks, the networks being designed for services or parts of services, a network management device being assigned to each network, and the network management devices being controllable by service management devices.

In the broadest sense, telecommunications systems are made up of a plurality of networks, several of which are interconnected, depending on the particular requirement, to establish an end-to-end connection. To control and monitor such systems, a functional management architecture is required, as described, for example, in ITU-T recommendations, in particular M.3010. A management architecture of this kind is schematically illustrated in Figure 2.

The lowest layer contains network elements NE, which are each managed by an element management device EMS. Above that, resides a layer made up of network management devices NMS, to which service management devices SMS are linked at a higher level. The functions of service management device SMS can be assumed, in part, by the customers themselves. This function is referred to as customer network management CNM. To manage the entire communications system in terms of business operations, the business management device BMS is then used.

In a nutshell, the network management devices are responsible for monitoring and controlling the network elements situated in one geographic region, while the

contractual aspects of the services provided to the customers are the focus of the service management devices (these include, inter alia, service orders, service complaints, and billing/accounting). In this connection, the concepts "NMF = network management function" and "SMF = service management function" were introduced for the functionalities allocated to the respective management layers.

An important capability of the communications system is to make available so-called end-to-end connections, a plurality of networks being required depending on the type of connection. To provide this as a most versatile possible service, the service management devices must, therefore, access a multiplicity of network management devices NMS. The result in the known systems is, therefore, a so-called many-to-many relation, as illustrated in Figure 3. In the process, the number of interfaces required between the network management devices NMS and the service management devices SMS quickly becomes virtually unmanageable.

The object of the present invention is to provide a device for controlling a telecommunications system made up of a plurality of networks, which, without entailing the mentioned disadvantages, will enable the service management devices to access the network management devices required for the particular services.

This objective is achieved in accordance with the present invention by providing domain management devices, which enable the service management devices to access network management devices. The domain management devices, in turn, have access to selected network management devices and are each able to be linked to a service management device.



The device according to the present invention requires a substantially smaller number of interfaces at the service management devices and the network management devices than do known devices.

One advantageous embodiment of the device according to the present invention provides for a controllable matrix for linking the service management devices to the domain management devices. It is preferably provided, in this context, for the controllable matrix to be controlled in conformance with the end-to-end connections to be managed in each instance.

A further refinement of the device according to the present invention provides for at least one customer network management device to be connectable via the matrix. This renders possible a dynamic allocation between the particular network management devices and customer network management devices, without entailing additional outlay for switching equipment.

Exemplary embodiments of the present invention are represented by several figures in the drawing and are elucidated in the following description. The figures show:

- Figure 1 a block diagram of an exemplary embodiment;
- Figure 2 a schematic representation of the known multilayer concept in accordance with the ITU-T recommendation;
- Figure 3 a schematic representation of the many-to-many relations between service management devices and network management devices;
- Figure 4 a block diagram of a further exemplary embodiment;
- Figure 5 a block diagram of a domain management device employed in the device according to Figure 4;

Figure 6 an example of an end-to-end connection traversing a plurality of networks which are managed by a device in accordance with the present invention; and

- 5 Figures 7 through 9 tables for illustrating the improvements effected by the present invention.

Figure 1 illustrates three service management devices SMS, each of which is connected to three domain managers DM, to which three or two network management devices are connected, in turn. A comparison to Figure 3 reveals that substantially fewer interfaces are needed than is the case when working with the known device.

- 10 In the exemplary embodiment in accordance with Figure 4, five service management devices 1 through 5 are able to be connected via a matrix 6, in the following, also referred to as correlation matrix, to five domain managers 7 through 11. Domain managers 7 through 11 have access to network management devices, of which merely three network management devices 12, 13, 14, are shown as examples in Figure 4.

- Also connected to correlation matrix 6 is a server 15 for the customer network management. Moreover, correlation matrix 6 is connected to two databases 16, 17, one being used as database KD DB (customer database), and the other as database SLA (= service level agreement). Server 15 can exchange data via two layers 18, 19 with customer devices 20, layer 18 providing a suitable operational structure in the sense of a corporate identity, identifying the telecommunications carrier, while layer 19 is designed as a security layer. In addition, each of network management devices 12, 13, 14 has assigned B-CNM (= basic customer network management) devices, whose data are fed to server 15.

For further clarification of the exemplary embodiment in accordance with Figure 4, reference is first made to Figures 4 and 5. Figure 5 depicts the functional units of a domain manager 7 through 11 (Figure 4). In this context, a management information distributor 31 is employed for the connection to correlation matrix 6 (Figure 4). A further data processing device 32 is used for data preparation, for precorrelation, and for converting from NMF to SMF. Subsystem adapters 33, 34, 35, of which merely three are shown illustratively in Figure 5, are used for the connection to the particular network management devices.

In parallel to service management devices 1 through 5, the service-oriented information is supplied to customer network management server 15. This ensures a uniform, comprehensive method for accessing the CNM information. The customer databases, domain-, service-, and customer-network management devices are linked with the aid of correlation matrix 6, employing an object-based communications infrastructure, which supports an end-to-end service correlation and renders possible a flexible modeling of complex services by combining the information communicated by the domain managers.

This communications infrastructure enables the service-relevant interconnection objects of various domain managers to be queried by the responsible service management device SMS, and for status modifications to be routed by the domain managers in dedicated fashion to service management device SMS. In addition, it provides the basis for transmitting customer queries from the customer network management system to service management device SMS and vice versa, to make available information of relevance to the customer, from service management device SMS via the customer network management system. Also the basic information for the correlation is fed via

this communications infrastructure to the domain managers, service management devices SMS, and to the customer network management systems.

5 The functionality of the domain managers resides in the adaptation of the subsystems, in the conversion of the network management information received from the subsystems, from the domains of fault, performance, and configuration management, into service-oriented  
10 information, as well as in the conversion of requests received from the service management devices into network management requests, and in the routing of such requests to the appropriate network management devices. The interface directed to service management devices is  
15 designed as a standardized, object-oriented interface, and is integrated in the communications infrastructure. Moreover, the domain manager assures the bidirectional exchange of information, and that the requests contained in the security concept with respect to access  
20 restrictions to the network management devices and with respect to the integrity and confidentiality of the data are observed (security management functions).

Figure 6 depicts the networks and management devices used  
25 for a frame-relay end-to-end connection. The connection is established between two terminal devices 41, 42, shown as computers, in each case via a customer service switch 43, 44, access networks 45, 46, and an ATM network 47 as a backbone network. A network management device 48, 49,  
30 50 is provided to manage each of these networks. Each of these network management devices is assigned, together with other network management devices, to a domain manager 51, 52. A service management device 53 has access to domain managers 51, 52 via a correlation matrix that  
35 is not shown in Figure 6. For purposes of exchanging data, customer database 16 is linked to the domain managers and to service management device 53. Moreover,

customer network management device 54 is connected to the service management device. The end-to-end connection from point A to point B is displayed on a screen 55 of customer network management device 54, making it possible for an operator to visualize the status of the connection and to intervene in case of errors.

The benefits of the device according to the present invention are elucidated in the following on the basis of an application example, where service and customer network management are made available for services based on ATM, frame relay, and leased link. For this, network management information from the following networks is to be integrated:

- 3 NMS for access components (B-NT-NMS, DTNMS and router NMS);
- 2 NMS for leased link (BFS, 46020);
- 3 NMS for ATM (Nortel NMS, 46020, NavisCore);
- 1 NMS for frame relay (Nortel NMS).

The relevance of the management information from the management perspective can be inferred from Figure 7.

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Figure 8 depicts the interfaces required at the domain managers in the direction of the individual networks and vice versa; while Figure 9 illustrates the interfaces required between the domain managers and the service management devices. One can discern that, regardless of the number of service management devices and independently of the service modeling, only one interface is needed for each network management device. The

advantages are particularly evident by the reduction in the load on the network management devices and the networks resulting from the transfer of management information. Also, the number of subnetwork management devices to be integrated per domain is substantially less than the number needed for a direct integration.

The correlation matrix can be used to properly channel the information relevant to the individual service management devices by performing a one-time correlation to administrative customer data. Customer network management server 15 is interfaced in such a way that all information relevant to customer network management is acquired via the correlation matrix as service-spanning information, but is provided with customer and service identification.

What is claimed is:

1. A device for controlling a telecommunications system made up of a plurality of networks, the networks being designed for services or parts of services, a network management device being assigned to each network, and the network management devices being controllable by service management devices,

wherein, in order for the service management devices (SMS) to access network management devices (NMS), domain managers (DM) are provided, which, in turn, have access to selected network management devices (NMS) and are each able to be linked to a service management device (SMS).

2. The device as recited in Claim 1, wherein a controllable matrix (6) is provided for linking the service management devices (SMS) to the domain managers (DM).

3. The device as recited in Claim 2, wherein the controllable matrix (6) is controlled in conformance with the end-to-end connections to be managed in each instance.

4. The device as recited in one of the Claims 2 or 3, wherein, in addition, at least one customer network management device (CNMS) is connectable via the matrix (6).

1/4

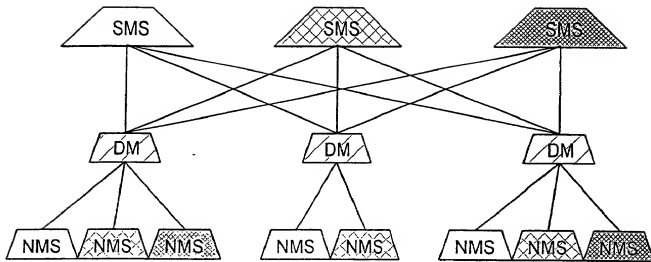


Fig. 1

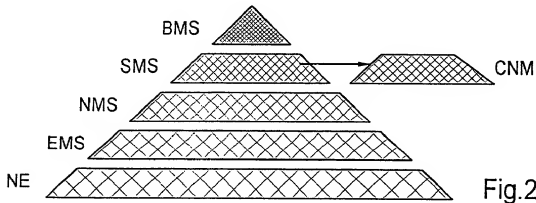


Fig. 2

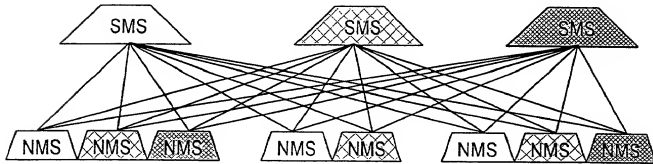
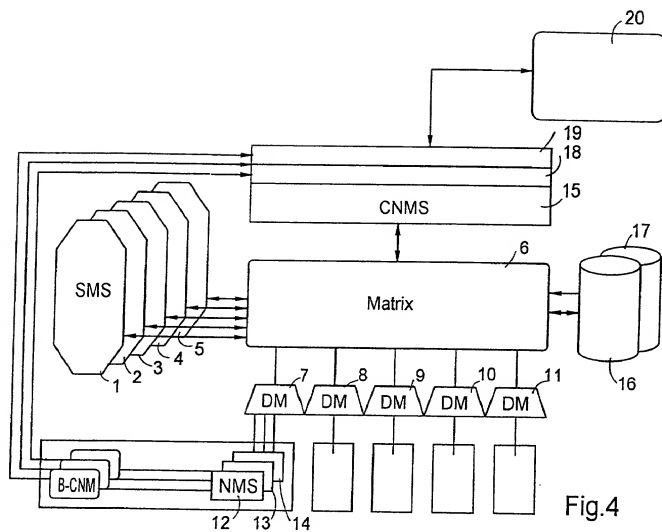


Fig. 3



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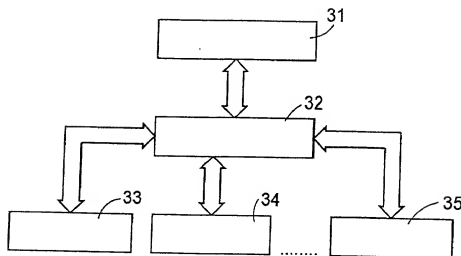


Fig. 5

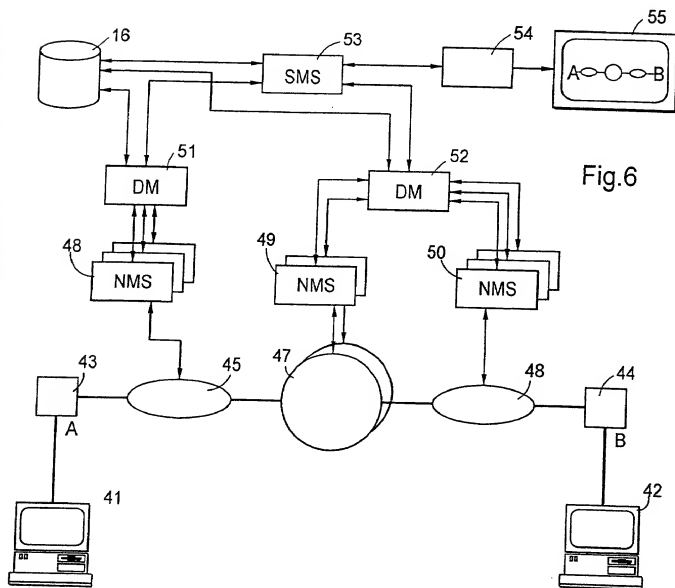


Fig. 6

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	ATM SMS	FR SMS	LL SMS	$\Sigma$
B-TN-NMS	*			1
DT-NMS	*	*	*	3
Router-NMS	*	*	*	3
BFS		*	*	2
46020 TDM		*	*	2
Nortel NMS ATM	*	*		2
46020 ATM	*	*		2
NavisCore ATM	*			1
Nortel NMS FR	*	*	*	3
$\Sigma$	7	7	3	

Fig.7

	Access DM	FR DM	ATM DM	LL DM	$\Sigma$
B-TN-NMS	*				1
DT-NMS	*				1
Router-NMS	*				1
BFS				*	1
46020 TDM				*	1
Nortel NMS ATM			*		1
46020 ATM			*		1
NavisCore ATM			*		1
Nortel NMS FR		*			1
$\Sigma$	3	1	3	2	

Fig.8

	ATM SMS	FR SMS	LL SMS	$\Sigma$
Access DM	*	*	*	3
FR DM	*	*	*	3
ATM DM	*	*	*	2
LL DM		*	*	2
$\Sigma$	3	4	3	

Fig.9

**DECLARATION AND POWER OF ATTORNEY**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled **DEVICE FOR CONTROLLING A TELECOMMUNICATIONS SYSTEM**, the specification of which was filed as International Application No. PCT/EP00/09427 on 27<sup>th</sup> of September 2000.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application(s) for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

**PRIOR FOREIGN APPLICATION(S)**

Number	Country Filed	Day/Month/Year	Priority Claimed Under 35 USC 119
199 495 31.9	Fed. Rep. of Germany	14 October 1999	Yes

And I hereby appoint Richard L. Mayer (Reg. No. 22,490), Gerard A. Messina (Reg. No. 35,952) and Linda M. Shudy (Reg. No. 47,084) my attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Please address all communications regarding this application to:

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Please direct all telephone calls to Richard L. Mayer at (212) 425-7200.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful and false statements may jeopardize the validity of the application or any patent issued thereon.

100  
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Inventor's Signature: Wolfgang Rie

Date: June, 11<sup>th</sup> 2001

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
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